

REMARKS

The Official Action dated March 15, 2005 has been received and its contents carefully noted. In view of the following remarks, it is respectfully requested that the rejections of record be reconsidered and withdrawn by the Examiner and that the present application be passed to issue. Claims 1-9 and 38-60 are presently pending in the instant application with claims 1-9 being withdrawn from further consideration by the Examiner as being directed to a non-elected invention. Claim 38 has been amended to provide proper antecedent basis for the limitations set forth therein. Entry and consideration of such amendment is earnestly solicited.

Referring now to the Official Action and particularly page 2 thereof, the Examiner notes that portions of the Information Disclosure Statement filed June 10, 2003 fail to comply with 37 C.F.R. §1.98(a)(2) in that the Examiner is unable to locate in the application image file the non patent literature "Notice of Reasons of Rejections" dated March 11, 2003. Further, the Examiner notes a scanned copy of Japanese Patent Publication 11-11930 and 11-07488 are not included in the application file. In this regard, submitted herewith are copies of the Reasons for Rejection, as well as the Japanese Patent Publications which have not been properly scanned by the U. S. Patent and Trademark Office. Accordingly, it is respectfully requested that these references along with the machine translated copies thereof be fully considered by the Examiner and indication of such consideration be set forth.

With reference now to Page 3 of the Office Action, claims 38, 39, 46, 48, 49, 50 and 52-60 have been rejected under 35 U.S.C. §102(b) as being anticipated by Japanese Patent Publication 11-150249 issued to Takeshi. This rejection is respectfully traversed in that the patent to Takeshi neither discloses nor suggests that which is presently set forth by Applicants' claimed invention.

As can be appreciated by the Examiner, independent claim 38 recites a method for fabricating a semiconductor device with the method comprising forming a metal lower electrode on a substrate, annealing the metal lower electrode in a reducing atmosphere that contains impurity atoms, forming a capacitive dielectric film on the metal lower electrode after step b) and forming an upper electrode on the capacitive dielectric film wherein the impurity atoms are introduced into the metal lower electrode in step b). That is, in accordance with the foregoing structure, the reduced impurity atoms are introduced into the metal of the electrode by annealing the metal electrode in a reducing atmosphere that contains the impurity atoms. In doing so, if the device is processed in an oxidizing atmosphere in a later stage, the metal lower electrode is prevented from being partially oxidized and therefore the distortion of the metal lower electrode can be suppressed.

In rejecting Applicants' claimed invention and particularly claim 38, the Examiner relies on the teachings of Takeshi wherein the Examiner states that Takeshi teaches a method for fabricating a semiconductor device with the method comprising the steps of forming a metal lower electrode on a substrate, annealing the metal lower electrode in a reducing atmosphere containing impurity atoms, forming a capacitive insulating film on the metal lower electrode after the step b) and forming an upper electrode on the capacitive dielectric film wherein the impurity atoms are introduced into the metal lower electrode in step b) which the Examiner states is inherent as admitted by Applicants on page 8, lines 18-20 at page 12, line 16 to page 15, line 2. However, it is respectfully submitted that the Examiner misunderstands the disclosure of Takeshi, particularly as it applies to the forming of a metal electrode on a substrate (paragraph 16; 12 and drawing 2) and annealing the metal lower electrode in a reducing atmosphere that contains impurity atoms (paragraph 17).

Specifically, with respect to paragraph 16 of the Takeshi reference, it is noted that a lower electrode 12 is disclosed, but it is not a metal electrode as recited by Applicants' claimed invention. As discussed in Takeshi, the lower electrode 12 is formed by patterning a ruthenium oxide film. As the Examiner can readily appreciate ruthenium oxide film is not a metal but an insulating film. In other words, the lower electrode 12 referred to by the Examiner at this stage is a non metal lower electrode which consists of a ruthenium oxide film which is quite different from that presently set forth by Applicants' claimed invention which specifically recites forming a metal lower electrode on a substrate.

Furthermore, as noted hereinabove, independent claim 38 specifically recites annealing the metal lower electrode film in a reducing atmosphere that contains impurity atoms. In this regard, with reference to paragraph 17 of Takeshi, it is disclosed that by performing heat treating using hydrogen, the lower electrode 12 which consists of a ruthenium oxide film is completely returned and changed into a ruthenium metal. In other words, the non metal lower electrode 12 which consists of a ruthenium oxide film is subjected to heat treatment using hydrogen to change it into a metal electrode made of a ruthenium metal. Accordingly, it is respectfully submitted that Takeshi fails to disclose annealing a metal lower electrode in a reducing atmosphere that contains impurity atoms which is specifically recited by Applicants' claimed invention.

Accordingly it is respectfully submitted that Takeshi merely discloses the step of changing a non metal lower electrode (a ruthenium oxide) into a metal lower electrode (a ruthenium metal) by thermally treating the non metal lower electrode in a reducing atmosphere that contains impurity atoms. However, Takeshi clearly fails to disclose the step of introducing impurity atoms into a metal lower electrode by thermally treating the metal

lower electrode in a reducing atmosphere that contains impurity atoms as recited by Applicants' claimed invention.

Moreover, with respect to the Examiner's contention that Applicants admit that it is inherent that impurity atoms are introduced into the metal lower electrode as evidenced by page 8 and page 12 to 15 in Applicants' specification, it is respectfully submitted that these portions of Applicants' specification refer to the present invention. In view of the discussion hereinabove with respect to the teachings of Takeshi, it is respectfully submitted that Takeshi neither discloses nor remotely suggests that which is presently set forth by Applicants' claimed invention. Accordingly, it is respectfully submitted that Applicants' claimed invention as set forth in independent claim 38 as well as those claims which depend therefrom clearly distinguish over the teachings of Takeshi and are in proper condition for allowance.

With reference to page 5 of the Office Action, claim 40 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Takeshi in view of U. S. Patent Publication No. 2000-0025622A1 issued to Schrems et al. This rejection is likewise respectfully traversed in that the patent to Schrems et al. does nothing to overcome the aforementioned shortcomings associated with the teachings of Takeshi.

While Schrems et al. may disclose a method of fabricating a capacitor comprising the step of annealing the bottom electrode in an argon atmosphere containing hydrogen, this reference fails to overcome the aforementioned shortcomings associated with Takeshi. Accordingly, it is respectfully submitted that Applicants' invention as set forth in independent claim 38 as well claim 40 which depends therefrom distinguishes over the prior art of record and is in proper condition for allowance.

With reference to page 6 of the Office Action, claim 41 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Takeshi in view of U.S. Patent No. 5,162,248 issued to Dennison et al. Again, this rejection is likewise respectfully traversed in that the patent to Dennison et al. does nothing to overcome the aforementioned shortcomings associated with Takeshi.

In rejecting dependent claim 41, the Examiner states that Dennison et al. teaches a method for fabricating a semiconductor device comprising the steps of forming an insulating film on the substrate, forming a recess on the insulating film before forming a lower electrode on a substrate wherein the lower electrode is formed in the recess. However, as noted hereinabove, the patent to Takeshi clearly fails to disclose that which is presently set forth in independent claim 38 and it is further noted that Dennison et al. fails to overcome these aforementioned shortcomings. Accordingly it is respectfully submitted that Applicants' claimed invention as set forth in claim 41 as it depends from claim 38 clearly distinguishes over the prior art of record and is in proper condition for allowance.

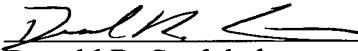
With reference to pages 7-10 of the Office Action and particularly the rejections of claims 42-45, 47 and 51, each of these claims have been rejected under 35 U.S.C. §103(a) as being unpatentable over Takeshi in view of one or more of Schrems et al., Dennison et al., U.S. Patent No. 5,382,817 issued to Kashihara et al., U.S. Patent No. 6,580,111 issued to Kim et al. and U.S. Patent No. 6,180,447 issued to Park et al.; however, as noted hereinabove, each of these claims are either directly or indirectly dependent upon claim 38 and include all the limitations thereof. Consequently, each of these rejections are respectfully traversed in that the secondary references cited by the Examiner fail to overcome the aforementioned shortcomings associated with Takeshi and consequently fail to render independent claim 38 obvious. Accordingly, it is respectfully submitted that Applicants' claimed invention as set

forth in each of the foregoing dependent claims clearly distinguishes over the prior art of record and are in proper condition for allowance.

Therefore, in view of the foregoing it is respectfully requested that the rejections of record be reconsidered and withdrawn by the Examiner, that claims 38-60 be allowed and that the application be passed to issue.

Should the Examiner believe a conference would be of benefit in expediting the prosecution of the instant application, he is hereby invited to telephone counsel to arrange such a conference.

Respectfully submitted,


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